

U.S. Patent Application No.: 09/447,030
Art Unit: 1754
Page 4

REMARKS

The present claims have been amended to be consistent with those included in the Preliminary Amendment filed January 21, 2005, which apparently arrived after the mailing of the current Office Action. To summarize, claims 13 and 25 have been cancelled and replaced by new claims 26 and 27 respectively in order to more clearly describe Applicants' invention. As a result, claims 14 and 20-22, which depended from claim 13, have been amended to depend from new claim 26. Finally, claims 17-21 have been amended to provide more clear antecedent basis as well as, in the case of claims 18 and 19, to correct a minor grammatical error. No new matter has been added. Thus, claims 14-22 and 26-27 are pending.

Rejection of Claims under 35 U.S.C. § 103(a)

Marisic in view of Fernholz et al., optionally further in view of Mielke et al.

The Examiner has rejected claims 13-24 under 35 U.S.C. § 103(a) as being unpatentable over Marisic (U.S. Patent No. 2,384,946) in view of Fernholz et al. (U.S. Patent No. 3,939,199) and optionally further in view of Mielke et al. (U.S. Patent No. 5,656,195).

On page 1 of the Office Action, the Examiner states that Marisic discloses a process of producing hydrogel pellets by continuously contacting within an enclosed mixing chamber such as an injector or nozzle mixer, streams of reactant solutions of such concentration and proportions that no gelation occurs with the mixer, but only at some predetermined time after leaving the mixer, and under such conditions of flow that each stream is completely and uniformly dispersed with and throughout the other at the instant of contact. The Examiner also states that the resultant colloidal solution is ejected from the mixer through an orifice or orifices of suitable size so as to form globules of the solution which are introduced into a fluid medium where the globules of the colloidal solution set to a gel before they pass out of the medium. The Examiner further identifies other features of Marisic, including the formation of

U.S. Patent Application No.: 09/447,030

Art Unit: 1754

Page 5

pellets by a process analogous to spray drying wherein the gelable solution is sprayed into a drying tower, that the fluid medium, which may contain components, can be constituted of a gas such as air and is maintained at a temperature below the boiling point of the sol, and that the hydrogel can be produced from a solution of sodium silicate and hydrochloric acid.

The Examiner notes that Marisic does not specifically disclose the temperature of the process. However, the Examiner concludes that it would have been obvious to optimize these process conditions to obtain the best results. The Examiner also concludes that it would have been obvious to dry the hydrogel to obtain aerogel, since aerogel is desired in the art. The Examiner adds that, in the event that the heat treating step of Marisic is not sufficient to convert the hydrogel to aerogel, Mielke et al. teaches that silica aerogel particles, which are desired to be used in moldings, can be produced by solvent exchange and subsequent supercritical drying of a silica hydrogel. The Examiner therefore concludes that it would have been obvious to one of ordinary skill in the art to convert the hydrogel of Marisic to aerogel because aerogel is desired to be used in moldings as suggested by Mielke et al.

The Examiner also notes that Marisic does not disclose that the fluid is moving substantially against the direction of gravity. However, the Examiner states that Fernholz et al. discloses that for a spray-drying process for converting a sol to a gel, in order to avoid damage of the gelled and still soft particles, they can be sprayed in an upward inclined direction and collected in a liquid bath (for example water) or they can be conducted in counter current flow with a current of air or gas which reduces their impact velocity and simultaneously improves their resistance to drying. The Examiner therefore concludes that it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a current of air or gas in counter current flow with the spray of silica sol in the process of Marisic, as suggested by Fernholz et al. because such counter current flow of air would reduce the silica gels impact velocity and improve their resistance by drying. The Examiner further concludes that, for claim 20, the subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to have used both the water bath and the counter current flow of air to avoid damage of the gelled and still soft

U.S. Patent Application No.: 09/447,030
Art Unit: 1754
Page 6

particles, because combining two or more ways as disclosed in Fernholz et al. for the same purpose has been held to be a prima facie case of obviousness.

On pages 4-5 of the Office Action, the Examiner addresses Applicants' previous arguments. In particular, regarding Applicants argument that Fernholz et al. is not analogous art to Marisic and that one skilled in the art would not be motivated to combine these references, the Examiner agrees that the sol or gel of Fernholz et al. is not silica as in Marisic. However, the Examiner further states that both Fernholz et al. and Marisic et al. deal with a problem concerning possible damage when converting soft sol into a gel and Fernholz et al. fairly suggests a solution for such a problem. The Examiner therefore concludes that it is clear that Fernholz et al. is reasonably pertinent to the particular problem with which the inventor was concerned. In addition, regarding Applicants' argument that Fernholz et al. disclosed the preparation of a carrier used for supporting the catalyst that is used for the oxyacylation process, the Examiner states that Fernholz et al. is only relied upon for the process of producing the carrier and is applied to teach how to minimize damage to the soft sol when converting it to a gel by using a countercurrent flow, as stated in the above rejection.

Applicants respectfully disagree. Regarding claims 13-23, claim 13 has been cancelled by this amendment, making the rejection of this claim moot. As discussed above, in order to more clearly describe Applicants' invention, claim 13 has been replaced with new claim 26. Claim 26 recites a method of producing substantially globular aerogels wherein i) gel forming components are mixed to produce a lyosol, ii) the lyosol is introduced into a moving medium which flows substantially against the direction of gravity to form a substantially globular lyogel, and iii) the substantially globular lyogel is converted to an aerogel.

On page 5 of the Office Action, the Examiner states that Fernholz et al. is only applied for the countercurrent flow method used to minimize damage to the soft sol. However, Applicants believe that the material described in Fernholz et al. for this step is not a sol. Rather, Fernholz et al. clearly states that, in an alternative method of preparing the carrier, "the gelled and still soft particles" [emphasis added] can be sprayed in an upward direction or

U.S. Patent Application No.: 09/447,030

Art Unit: 1754

Page 7

in a countercurrent flow (see column 2, lines 23-31). Thus, it is clear that the material used in the countercurrent flow has already gelled. Therefore, it is not a sol.

Furthermore, Fernholz et al. specifically refers to the spraying of a soft particle. This particle is prepared from the smaller "particles without pores" and are held together by various types of "inorganic glue" to form "larger balls, tablets, or granules suitable for the manufacture of catalysts" (see column 1, line 66 and column 2, lines 10-19). Thus, the "soft particle" referred to in Fernholz et al. is an aggregate of smaller particles glued together by a gel, and it is this type of particle that Fernholz et al. refers to being used in a countercurrent flow "in order to avoid damage" - not a sol.

By comparison, Marisic describes a process of producing hydrogel pellets by continuously contacting, within an enclosed mixing chamber, streams of reactant solutions of such concentration and proportions that no gelation occurs with the mixer. Gellation occurs at some predetermined time after leaving the mixer. The resulting colloidal solution is ejected from the mixer so as to form globules of the solution, which sets to a gel before they pass out of the medium. Thus, Marisic teaches introducing a sol (specifically, a hydrosol) into a vapor atmosphere.

Since Marisic and Fernholz et al. each describe very different types of particles, Applicants believe that one skilled in the art would not be motivated to combine Marisic and Fernholz et al. Fernholz et al. is non-analogous art to Marisic. Furthermore, since the method of the present invention comprises the step of introducing a sol (specifically a lyosol) into a moving medium, Fernholz et al. is not reasonably pertinent to the particular problem with which the inventor was concerned and does not fairly suggest a solution to a problem concerning possible damage when converting a soft sol into a gel, contrary to the Examiner's statement on page 5 of the Office Action. Rather, Fernholz et al. teaches a solution to a problem concerning possible damage to an aggregated particle comprising a sol that has already gelled. It does not relate to a sol at all. Therefore, Applicants do not believe that one skilled in the art would combine Marisic and Fernholz et al.

U.S. Patent Application No.: 09/447,030
Art Unit: 1754
Page 8

Even if these references were combined, which Applicants do not believe would be done, the result would not be the method of the present invention. Rather, since Fernholz et al. teaches a countercurrent flow for use with a gelled aggregate, Applicants submit that one skilled in the art would therefore use such a flow for the gels (i.e., the hydrogels) of Marisic. Clearly, this is not the method of the present invention in which a lyosol is introduced into a fluid medium, not a gel.

Regarding Mielke et al., Applicants believe that this reference cannot cure the deficiencies of Marisic. In particular, while Mielke et al. shows that a silica aerogel can be produced by solvent exchange and subsequent supercritical drying of a silica hydrogel, there is no teaching or suggestion anywhere in Mielke et al. of a process in which a lyosol is introduced into a medium which flows substantially against the direction of gravity. Furthermore, the Examiner states that this reference teaches that aerogel particles are desired to be used in moldings. However, none of the present claims recites a molding.

Therefore, since Marisic cannot be combined with Fernholz et al. or, if combined, would not result in the method of the present invention, and since Mielke et al. cannot cure the deficiencies of Marisic, Applicants believe that claim 26 is patentable over Marisic in view of Fernholz et al. and optionally further in view of Mielke et al. Claims 14-22, which depend either directly or indirectly from claim 26, recite further embodiments of the present invention and, for at least the reasons discussed above, are also patentable over this combination of references.

Applicants therefore believe that claims 14-22 and 26 are patentable over Marisic in view of Fernholz et al., optionally further in view of Mielke et al. and respectfully request that this rejection be withdrawn.

Regarding new claim 27, this claim recites a method of producing substantially globular silylated lyogels in which a substantially globular lyogel is produced and reacted with a silylating agent. Since Applicants believe that the method of producing substantially globular lyogels is patentable over Marisic in view of Fernholz et al., optionally further in view of Mielke et al., the method of claim 27 is also patentable over this combination of references. In

U.S. Patent Application No.: 09/447,030

Art Unit: 1754

Page 9

addition, there is no disclosure in Fernholz et al. of silylation. Therefore Applicants believe that claim 27 is patentable over this combination of references.

Marisic in view of Fernholz et al. and Frank et al.

The Examiner has rejected claims 13-22 and 25 under 35 U.S.C. § 103(a) as being unpatentable over Marisic (U.S. Patent No. 2,384,946) in view of Fernholz et al. (U.S. Patent No. 3,939,199) and Frank et al. (U.S. Patent No. 5,789,075).

On page 4 of the Office Action, the Examiner states that Marisic and Fernholz et al. are applied as stated in the above rejection and notes that the difference not yet discussed is that Marisic does not teach the silylation step. For this reason, the Examiner refers to Frank et al, stating that this reference discloses that it is known in the art to convert gels into xerogels by modifying the gels by silylation in such a way that the gels can be dried without collapsing. The Examiner therefore concludes that it would have been obvious to one of ordinary skill in the art to convert the gel of Marisic into an aerogel (i.e., xerogel) by first silylating the gel, as suggest by Frank et al. in order to dry the gel without collapsing the gel structure because Frank et al. teaches that aerogel is a desired product in the art.

Applicants respectfully disagree. Regarding claims 13-22, claims 13 and 25 have been cancelled by this amendment, making the rejection of these claims moot. As discussed above, in order to more clearly describe Applicants' invention, claims 13 and 25 have been replaced with new claims 26 and 27. Claim 26 recites a method of producing substantially globular aerogels wherein i) gel forming components are mixed to produce a lyosol , ii) the lyosol is introduced into a moving medium which flows substantially against the direction of gravity to form a substantially globular lyogel, and iii) the substantially globular lyogel is converted to an aerogel. Claim 27 recites a method of producing substantially globular silylated aerogels wherein i) gel forming components are mixed to produce a lyosol , ii) the lyosol is introduced into a moving medium which flows substantially against the direction of gravity to form a substantially globular lyogel, and iii) the substantially globular lyogel is reacted with a silylating agent to form a substantially globular silylated lyogel.

U.S. Patent Application No.: 09/447,030

Art Unit: 1754

Page 10

As discussed in more detail above, Applicants do not believe that one skilled in the art would combine Marisic and Fernholz et al. since each of these reference relate to very different types of particles. Marisic describes a process in which a sol (specifically a hydrosol) is introduced into a vapor atmosphere while Fernholz et al. teaches a process in which an aggregate of smaller non-porous particles glued together by a gel (not a sol) are used in a countercurrent flow. Applicants therefore believe that claims 26 and 27 are patentable over Marisic in view of Fernholz et al. since these references are non-analogous art and cannot be combined. Furthermore, even if combined, Applicants believe that the result would not be the method of claims 26 and 27. Rather, as discussed above, one skilled in the art may consider using the countercurrent flow of Fernholz et al., applied to a gelled aggregate, for the hydrogels of Marisic. This is not the method of claims 26 or 27.

Regarding Frank et al., Applicants believe that this reference cannot cure the deficiencies of Marisic. In particular, while Frank et al. does disclose that aerogels may be modified by silylation, there is no teaching or suggestion anywhere in Frank et al. of a process in which a lyosol is introduced into a medium which flows substantially against the direction of gravity.

Therefore, since Marisic cannot be combined with Fernholz et al. or, if combined, would not result in the method of the present invention, and since Frank et al. cannot cure the deficiencies of Marisic, Applicants believe that claims 26 and 27 are patentable over Marisic in view of Fernholz et al. and Frank et al. Claims 14-22, which depend either directly or indirectly from claim 26, recite further embodiments of the present invention and, for at least the reasons discussed above, are also patentable over this combination of references.

Applicants therefore believe that claims 14-22 and 26-27 are patentable over Marisic in view of Fernholz et al. and Frank et al. and respectfully request that this rejection be withdrawn.

U.S. Patent Application No.: 09/447,030

Art Unit: 1754

Page 11

Conclusion

In view of the foregoing remarks, Applicants believe that this application is considered to be in good and proper form for allowance, and the Examiner is respectfully requested to pass this application to issue. If, in the opinion of the Examiner, a telephone conference would further expedite the prosecution of the subject application, the Examiner is invited to call the undersigned.

Respectfully submitted,



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